I CLAIM:

1. A method of heating a substrate in a process chamber using a heated chuck, comprising:

lowering the substrate onto the chuck;

heating the substrate to a first temperature less than a temperature of the chuck;

raising the substrate away from the chuck while the substrate is at the first temperature;

processing the substrate while the substrate is raised away from the chuck;

lowering the substrate back onto the chuck;

heating the substrate to a second temperature greater than the first temperature; and

further processing the substrate after heating the substrate to the second temperature.

2. The method of Claim 1, wherein the processing comprises photoresist ashing.

3. The method of Claim 1, wherein the temperature of the chuck is maintained constant throughout all of the method steps.

4. A method of controlling a temperature of a substrate during a substrate processing sequence, the method comprising:

providing a thermal chuck at a first temperature that is at least a maximum desired substrate temperature and maintaining the chuck at said first temperature;

supporting a wafer above the chuck;

selectively moving the substrate between a plurality of positions by selectively increasing and decreasing a gap between the substrate and the chuck; and

conduct processing of the wafer at the plurality of positions while maintaining the chuck at the first temperature.

5. The method of Claim 4, further comprising maintaining the substrate in proximity to the chuck for a pre-determined length of time in order to increase the temperature of the substrate to a desired temperature.

6. The method of Claim 4, further comprising varying a chamber pressure during a heating or cooling step to facilitate increased heat transfer between the chuck and the substrate.

7. A substrate processing system comprising:

a processing chamber;

a thermal chuck configured to be maintained at a constant temperature while loading, processing and unloading a plurality of wafers in sequence; and

a support structure configured to support a substrate and being coupled to a motion control system configured to selectively vary a distance between a top surface of the thermal chuck and a bottom surface of the substrate between a plurality of discrete positions;

wherein the system is configured to process a substrate when the substrate is supported at two or more of the discrete positions.

8. The substrate processing system of Claim 6 further comprising an automatic control system programmed to, in sequence:

reduce a chamber pressure to a processing pressure;

lower the substrate into proximity with the chuck;

maintain the substrate in proximity to the chuck until the substrate reaches a first temperature;

raise the substrate above the chuck; and

perform a first processing step.

9. The substrate processing system of Claim 7 wherein the automatic control system is further programmed to perform the following steps in sequence after performing said first processing step:

lower the substrate into proximity with the chuck and maintain the substrate in proximity to the chuck until the substrate reaches a second temperature;

performing a second processing step.

10. The substrate processing system of Claim 8, wherein the automatic control system is further configured to change a chamber pressure to an intermediate pressure

between a process pressure and a load/unload pressure before lowering the substrate into proximity with the chuck.

11. A method of controlling silicon dioxide loss during processing of a silicon dioxide substrate, the method comprising varying a concentration of a fluorine-containing gas compound as an inverse function of substrate temperature.

12. The method of Claim 11, wherein the substrate temperature is controlled by a thermal chuck that is maintained at a constant temperature throughout a plurality of processing cycles.

13. A method of controlling silicon dioxide loss during processing of a silicon dioxide substrate, the method comprising varying a plasma power level as a function of substrate temperature.

14. The method of Claim 13, wherein the substrate temperature is controlled by a thermal chuck that is maintained at a constant temperature throughout a plurality of processing cycles.